

levels and emergency room visits and hospital admissions for respiratory distress. This is true for healthy and asthmatic individuals, especially children whose respiratory systems are still developing and individuals who work outside during the summer ozone season. Some effects are not reversed during periods of clean air exposure, raising concern about the cumulative impact that seasonal exposures may have over the years.

Ozone in the lower atmosphere has an adverse effect on plants and damages manmade and natural materials. Ozone affects plant growth and reproduction by interfering with the plants' ability to produce and store food. This reduces overall plant health, making plants more susceptible to disease, pests and the effects of environmental stresses such as high temperatures, drought conditions, and other pollutants. Ozone can directly damage plant foliage and affect essential plant processes. For example it can reduce the amount of carbohydrates produced and alter the overall growth pattern of plants. Long-lived species such as trees suffer from the cumulative effects of repeated exposures. Ozone also can reduce yields of many agricultural crops that are important to North Carolina, including tobacco, nursery stocks, cotton, corn, soybeans, wheat, and peanuts.

Ozone damages natural rubber and synthetic polymers, textile fibers and dyes. Fibers such as cotton, nylon, and acrylic show varying degrees of degradation due to exposure to ozone. Other studies have reported a causal relationship between ozone and changes in color of certain dyes used in textiles.

Ozone has been shown to have a detrimental effect on fine paintings. Frequently, the paints used in older paintings have undergone substantial and permanent color changes after exposure to ozone.

Trends

Ozone is the most difficult to control of the six criteria air pollutants for which National Ambient Air Quality Standards (NAAQS) have been established. Currently, all of North Carolina meets the ozone standard, although three areas in North Carolina previously have been designated as **A**Moderate Nonattainment Areas for Ozone.[@]These former nonattainment areas, with their respective ozone attainment redesignation dates, include: Charlotte-Gastonia (July 5, 1995), Greensboro--Winston-Salem--High Point (November 8, 1993), and Raleigh-Durham (June 17, 1994).

Ozone levels have tended to decrease over the long term in North Carolina, with average concentrations varying between 0.09 PPM and 0.11 PPM (**Figure 9**). Higher than usual concentrations occurred in 1987-1988.

The maximum ozone concentrations are highly variable. Exceedances have occurred within the state in 20 of the 24 years from 1972 to 1995 (**Figure 10**).

In July 1997, the EPA adopted a new federal ozone standard of 0.08 parts per million measured over eight hours. Violations will occur when ozone levels exceed the standard, based on a three-year average of the fourth-highest ozone readings at each monitor. The EPA plans to determine which areas exceed the standard in July 2000, based on monitoring during